

What is claimed is:

1. A method for conferring cytoprotection to a cell, comprising contacting said cell with an amount of ethyl pyruvate, effective to confer cytoprotection.
2. The method of claim 1, wherein said cell is within or isolated from an organ which is ischemic.  
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3. The method of claim 1, wherein said cell is within or isolated from an organ, which is at risk of ischemia.
4. The method of claim 1, wherein contacting said cell is conducted *in vivo*.
5. The method of claim 1, wherein said cell is of cardiac, intestinal or neural  
10 origin.
6. The method of claim 5, wherein said cell is within or isolated from myocardium.
7. The method of claim 1, wherein contacting said cell is conducted *ex-vivo*.
8. The method of claim 1, wherein said cell is implanted within a subject  
15 following contact with said effective amount of ethyl pyruvate.
9. The method of claim 1, wherein said effective amount of ethyl pyruvate inhibits or prevents oxidative damage to said cell.
10. The method of claim 1, wherein said effective amount of ethyl pyruvate augments cellular metabolism.
- 20 11. The method of claim 1, wherein said cell is within a population of cells which will be transplanted to a subject.
12. A method for conferring cytoprotection to a cell, comprising contacting said cell with an amount of an ester of an alpha-ketoalkanoic acid effective to confer cytoprotection.
- 25 13. The method of claim 12, wherein said ester is a C<sub>3</sub>-C<sub>8</sub> straight-chained or branched alpha-ketoalkanoic acid.
14. The method of claim 12, wherein said ester is an alkyl, aralkyl, alkoxyalkyl or carbalkoxyalkyl ester.
15. The method of claim 14, wherein said ester is an ethyl ester.
- 30 16. The method of claim 12, wherein said cell is within or isolated from an organ which is ischemic.

17. The method of claim 12, wherein said cell is within or isolated from an organ, which is at risk of ischemia.
18. The method of claim 12, wherein contacting said cell is conducted in vivo.
19. The method of claim 18, wherein said cell is of cardiac, intestinal or neural origin.
- 5 20. The method of claim 12, wherein said cell is within or isolated from myocardium.
21. The method of claim 12, wherein contacting said cell is conducted ex-vivo.
22. The method of claim 12, wherein said cell is implanted within a subject following contact with said effective amount of said ester of an alpha-ketoalkanoic acid.
- 10 23. The method of claim 12, wherein said effective amount of said ester of an alpha-ketoalkanoic acid augments cellular metabolism.
24. The method of claim 12, wherein said cell is within a population of cells which will be transplanted to a subject.
- 15 25. A method for treating or reducing damage to the heart due to ischemia or reperfusion injury in a subject, comprising administering ethyl pyruvate to said subject in an amount effective to treat or reduce ischemic damage to the heart.
26. A method for treating or reducing damage to the heart due to ischemia or reperfusion injury in a subject, comprising administering an ester of an alpha-ketoalkanoic acid to said subject in an amount effective to treat or reduce ischemic damage to the heart.
- 20 27. The method of claim 26 wherein said ester is a C<sub>3</sub>-C<sub>8</sub> straight-chained or branched alpha-ketoalkanoic acid.
28. The method of claim 26, wherein said ester is an alkyl, aralkyl, alkoxyalkyl or carbalkoxyalkyl ester.
- 25 29. The method of claim 26, wherein said ester is an ethyl ester.
30. The method of claim 29, wherein said ester is ethyl pyruvate.
31. The method of claim 26 wherein said cells are myocardial cells.
- 30 32. The method of claim 26, wherein said ester of an alpha-ketoalkanoic acid is administered to said subject prior to a surgical procedure having potential to cause cardiac ischemic damage.

33. The method of claim 26, wherein said ester of an alpha-ketoalkanoic acid is administered to said subject during a surgical procedure having potential to cause cardiac ischemic damage.
34. The method of claim 26, wherein said ester of an alpha-ketoalkanoic acid is administered to said subject following a surgical procedure having potential to result in cardiac ischemic damage.  
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35. The method of claim 26, wherein said subject is in need of said treatment due to an angina condition which comprises chronic stable angina, unstable angina or post myocardial infarction angina.
- 10 36. The method of claim 26, wherein said subject is in need of such treatment due to acute myocardial infarction.
37. The method of claim 33, wherein said surgical procedure is coronary artery bypass surgery.
- 15 38. The method of claim 33, wherein said surgical procedure is cardiopulmonary bypass surgery.
39. The method of claim 33, wherein said surgical procedure is off-pump coronary artery bypass surgery.
40. The method of claim 33, wherein said procedure is conducted in the thoracic cavity.
- 20 41. A method for treating or reducing stroke-related injury, in a subject, comprising administering ethyl pyruvate to said subject in an amount effective to treat or reduce stroke-related injury in said subject.
42. A method for treating or reducing stroke-related injury, in a subject, comprising administering an ester of an alpha-ketoalkanoic acid to said subject  
25 in an amount effective to treat or reduce stroke-related injury in said subject.
43. The method of claim 53, wherein said ester of an alpha-ketoalkanoic acid augments cellular metabolism in a neuron in said subject.
44. A method of treating, or inhibiting myocardial infarction or damage caused by myocardial infarction in a subject, the method comprising administering an  
30 amount of ethyl pyruvate to a subject at risk for or undergoing myocardial infarction, effective to treat or inhibiting myocardial infarction or damage caused by myocardial infarction.

45. The method of claim 44, wherein said ester of an alpha-ketoalkanoic acid augments cellular metabolism in myocardial cells in said subject.
46. The method of claim 44, wherein said ester of an alpha-ketoalkanoic acid enhances cardiac function, limits infarct size, or a combination thereof, in said subject.
- 5       47. Use of a composition comprising ethyl pyruvate ester of an alpha-ketoalkanoic acid for treating or preventing ischemic damage in an organ in a subject.
- 10      48. Use of a composition comprising an ester of an alpha-ketoalkanoic acid for treating or preventing ischemic damage in an organ in a subject.
49. The use of claim 48, wherein said ischemic damage is to the heart, intestine, or central nervous system.
50. Use of a composition comprising an ester of an alpha-ketoalkanoic acid as a cytoprotective agent for cells or organs for transplantation.

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